CLAIMS

What is claimed is:

1. A magnetic head comprising:

a read sensor including:

at least one primary pinned layer;

a barrier layer;

a free layer;

an in-stack biasing structure having net magnetic moment dM=0, which acts to stabilize said free layer by exchange coupling.

2. The magnetic head of claim 1, wherein:

said in-stack biasing structure includes paired layers of opposite magnetic orientation which are separated by a spacer layer, such that the net magnetic moment of said paired layers is substantially zero.

3. The magnetic head of claim 1, wherein:

said dM=0 corresponds to a dT less than 5×10^{-10} meters, where magnetic thickness T = M x t, and M equals magnetization, t equals thickness of material, and dT is the differential in the layer thicknesses.

4. The magnetic head of claim 1, wherein:

said in-stack biasing structure includes a self-pinned layer pair.

5. The magnetic head of claim 1, wherein:

said at least one primary pinned layer includes a pair of primary pinned layers, separated by a spacer layer.

6. The magnetic head of claim 5, further comprising:

at least one layer of AFM material which acts to pin said pair of primary pinned layers.

7. The magnetic head of claim 5, wherein:

said pair of primary pinned layers are self-pinned layers.

8. The magnetic head of claim 1, wherein:

said read sensor is of Current Perpendicular to the Plane (CPP) configuration.

9. A disk drive comprising:

at least one hard disk;

at least one magnetic head adapted to fly over said hard disk for writing data on said hard disk, and having an air bearing surface, said magnetic head including:

a read sensor including:

at least one primary pinned layer;

a barrier layer;

a free layer;

an in-stack biasing structure having dM=0, which acts to stabilize said free layer by exchange coupling.

10. The disk drive of claim 9, wherein:

said in-stack biasing structure includes paired layers of opposite magnetic orientation which are separated by a spacer layer, such that the net magnetic moment of said paired layers is substantially zero.

11. The disk drive of claim 9, wherein:

said dM=0 corresponds to a dT less than 5×10^{-10} meters, where magnetic thickness T = M x t, and M equals magnetization, t equals thickness of material, and dT is the differential in the layer thicknesses.

12. The disk drive of claim 9, wherein:

said in-stack biasing structure includes a self-pinned layer pair.

13. The disk drive of claim 9, wherein:

said at least one primary pinned layer includes a pair of primary pinned layers, separated by a spacer layer.

14. The disk drive of claim 13, further comprising:

at least one layer of AFM material which acts to pin said pair of primary pinned layers.

15. The disk drive of claim 13, wherein:

said pair of primary pinned layers are self-pinned layers.

16. The disk drive of claim 9, wherein:

said read sensor is of Current Perpendicular to the Plane (CPP) configuration.

17. A method of fabrication of a read head sensor, comprising:

A) fabricating at least one primary pinned layer;

B) fabricating a free layer above said at least one primary pinned layer; and

C) fabricating an in-stack biasing structure having dM=0, which acts to bias said free layer by exchange coupling.

18. The method of fabrication of claim 17, wherein:

said in-stack biasing structure includes a self-pinned layer pair.

19. The method of fabrication of claim 17, wherein:

said at least one primary pinned layer includes a pair of primary pinned layers, separated by a spacer layer.

20. The method of fabrication of claim 17, wherein A further comprises:

fabricating at least one layer of AFM which acts to pin said pair of primary pinned layers.

21. The method of fabrication of claim 17, wherein:

said pair of primary pinned layers are self-pinned layers.